JPRS 75747

21 May 1980

East Europe Report

SCIENTIFIC AFFAIRS

No. 674

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 75747

21 May 1980

EAST EUROPE REPORT

SCIENTIFIC AFFAIRS

No. 674

CONTENTS

INTERNATIONAL AFFAIRS

Libya Orders Hungarian Computer for Its Soviet Reactor
(Lajos Budai; GAZETA LUBUSKA, 24 Apr 80) 1

Development of Uniform Digital Computer System Outlined
(M. Ye. Rakovskiy; INFORMATYKA, Mar 80) 2

ALBANIA

Use of Radioactive Isotopes in Agriculture
(Agrikol Gjermeni; ZERI I POPULLIT, 23 Feb 80) 8

BULGARIA

Current Research, Achievements in Biology Outlined
(G. Sveshtarov; ZEMEDELSKO ZNAME, 18 Apr 80) 12

Electronic Taxi Meter Described
(VUNSHNA TURGOVIYA, No 3, 1980) 15

CZECHOSLOVAKIA

Solar Observation Satellite Launching Scheduled for 1981
(Karel Pacner; MLADA FRONTA, 18 Apr 80) 16

Grain Silage in Steel Tower Silos
(Jan Viska; MECHANIZACE ZEMEDELSTVI, Feb 80) 21

HUNGARY

Labor Psychology Laboratory of the Csepel Iron and Steel Works
(Jeno Dulin Interview; MAGYAR PSZIHOLOGIAI SZEMLE, No 1, 1980) 33

CONTENTS (Continued)

POLAND

Computerized Character Readers Developed For Printing, Information
(TRYBUNA LUDU, 22 Apr 80) 38

LIBYA ORDERS HUNGARIAN COMPUTER FOR ITS SOVIET REACTOR

Zielona Gora GAZETA LUBUSKA in Polish 24 Apr 80 p 5

[Article by Lajos Budai: "Hungarian Accomplishments: A Computerized Reactor Control System"]

[Text] In the fall of 1978 the workers of the Budapest Central Institute of Physics Research put into operation a complex computer control system for an experimental reactor. An improved variety of that system will be installed in the experimental reactor being built by the Soviet Union in Libya. The system was jointly designed by the Central Institute of Physics Research, the TRANSELEKTRO Hungarian Enterprise for Foreign Trade in Electrical Goods, the CHEMIMAS Chemical Machine Building Design Enterprise, and the VIDEOTON Radio and Television Plant.

The computer control system performs not only the data processing and recording tasks associated with operating instructions but also determines reactor capacity and the temperature of the coolant efflux. It is based on modern control principles. The Institute's reactor operates on the basis of the so-called direct digital control.

The operations of the computer of the Central Institute of Physics Research are adapted to normal and near-normal operating conditions of the reactor. If deviations from these conditions occur, the program provides for recovery of normal state without stopping the computer. In this case at most the reactor's capacity decreases.

Such a technical solution has the advantage of linking operating safety to continuity of operation. Were a major breakdown of the reactor to occur in excess of the computer's scope of operation, the reactor would be stopped by an autonomous safeguard system; on the other hand, were the computer to break down, the reactor would be controlled by a separate control apparatus.

It is these perfected safeguards that are the reason why the ATOMENERGOEKSPORT Soviet foreign trade enterprise ordered from the Institute the computer system for the experimental reactor being built in Libya.

1386
CSO: 2602

DEVELOPMENT OF UNIFORM DIGITAL COMPUTER SYSTEM OUTLINED

Warsaw INFORMATYKA in Polish No 3, Mar 80 pp 20-22

[Article by M. Ye. Rakovskiy, candidate of technical sciences, USSR: "Collaboration Within the Framework of the Uniform System of Electronic Digital Computers: Results and Prospects"]

[Text] Ten years ago (in 1969--editor's note) the CEMA member countries signed a bilateral agreement for cooperation in computer science. The Intergovernmental Commission consisting of representatives of the People's Republic of Bulgaria, the People's Republic of Hungary, the GDR, the Polish People's Republic, the USSR, and the Czechoslovak SSR, and subsequently also of Cuba and the Socialist Republic of Romania, was appointed. The task of the commission was to organize collaboration among these countries in computer design, planning of the production of hardware and software, and the use of computers in the national economy.

What are the results of the past decade?

Above all, it should be stressed that a common policy for the development of computer science was worked out, and the subject matter and scope of research and design work was agreed upon. The YeS EDC [Yednolitaya Sistema or Uniform System of Electronic Digital Computers] was established with respect to third-generation computers, and a set of interconnected standards for that system was developed. The set consists of 32 documents on the basis of which the countries participating in the agreement drafted their own state and ministerial norms. This assures complete compatibility of all YeS EDC devices as well as broad specialization and co-production in the production and deliveries of computer equipment. Suffice it to mention that during 1971-1978 barter comprising computer-computation equipment among the countries participating in the agreement increased by a factor of 20.

All YeS EDC equipment is manufactured in the form of standardized units, subassemblies, and components. Input/output interfaces, direct and peripheral equipment commands, and power supply units are all standardized.

Thus they can be continually improved and incorporated in the already existing computer models so as to prevent their obsolescence. Also standardized are the research techniques, design documents, ergonomic requirements, reliability parameters, and terminology. All this simplifies and accelerates the activation of the computers exported among the countries participating in the agreement. Since the YeS EDC standards allow for ISO [International Organization for Standardization] and IEC [International Electrotechnical Commission] standards, Uniform System equipment can also be exported to third-party countries, particularly now that interest in that equipment is steadily rising and its first specimens already operate in Finland, Belgium, France and India.

Cooperation among the countries participating in the agreement is highly organized. Attached to the Intergovernmental Commission are the Coordinating Center, the Economic Council, the Council of Main Computer Designers, the Council for the Utilization of Computer Technology, the Council for Comprehensive Technical Maintenance, and various working groups. Owing to their activities, new designs are rapidly developed and introduced.

Already within the first 4 years since the formation of the Intergovernmental Commission, 6 YeS EDC computers and about 120 peripheral devices have been developed. During the subsequent 2 years, the computers of the first series were modernized: their operating speeds were tripled, the logic structures of processors and channels were improved, and integrated circuitry was incorporated. A major quality index--the ratio of operating speed to cost--has markedly improved. The mass production of the third-generation computers enabled the socialist countries to virtually cease importing that hardware from the capitalist countries.

During 1977-1978 the member countries commenced the production of the second series of YeS EDC computers: the YeS 1015 (Hungarian People's Republic), the YeS 1025 (Czechoslovak SSR), the YeS 1035 (People's Republic of Bulgaria, the USSR), the YeS 1045 (Polish People's Republic, USSR), the YeS 1055 (the GDR), and the YeS 1060 and YeS 1065 (USSR). These computers are of much higher capacity: e.g. the YeS 1065 performs 4.5 million operations per second. All new models are equipped with virtual memory, and the computers with medium and high computational capacity can operate in the multiplexer unit mode. These computers completely satisfy present-day worldwide requirements for third-generation computers. As for the capacity-cost index, moreover, it is 2 to 3 times as high as that of the modernized first-series computers.

The second-series computers are currently being series-produced. Hence work is already underway on third-series models, designed for introduction in 1982-1983 and scheduled to have disk memories with a capacity of 30-200 M bytes--and later 400 M bytes--each. Each computer will be equipped with 4 to 6 such memories. The capacity of the direct-access memory of the third-series models will increase to 2-5 M bytes. Combined with the greater operating speeds, this will improve the capacity-cost index by a factor of 7 and the reliability index, by a factor of 5.

Aside from the large YeS EDC computers, the member countries also are developing and producing minicomputer systems (SM EDC). These are chiefly designed for automated control systems (ASU) for the control of continuous and continuous-intermittent technological processes, machine tools, and mechanized warehouses. SM EDC will also find application in the automation of experiments in scientific research, in the control of intricate scientific equipment and research posts, and in automating the monitoring of intricate products, as well as in the form of satellite devices and terminals for large computational or control systems.

The countries participating in the agreement attempt to maximally utilize all the advantages of the socialist division of labor through the development of specialization and co-production. The Intergovernmental Commission set itself the aim of assuring a profitable scale of production of digital computers, devices, and components. This assures organizing enterprises of optimal size, rapidly modernizing the already existing plants, and using the most up-to-date machinery and technologies within them.

For example, 12 plants producing YeS and SM EDC and electronic equipment were built in the People's Republic of Bulgaria. A new branch of industry with an annual output of hundreds of millions of rubles has arisen. Many of the Bulgarian factories have a facilities and scale of output that are of a level not inferior to the plants of France, Japan, Italy, and GDR. These factories include, e.g. the Stara Zagora Plant, which manufactures disk memories that fully correspond to ISO recommendations.

The output of computer equipment in Hungary has increased by a factor of 16 during 1971-1977. That country has chiefly become specialized in the production of small YeS computers as well as of teleprocessing devices and systems.

More than 15,000 disk memories have been exported during 1971-1976 by the German Democratic Republic to the countries participating in the agreement. In accordance with the specialization plans, the GDR also manufactures main YeS 1040 and YeS 1055 computers as well as many peripherals that broaden the scope of application of YeS EDC computers.

Polish industry manufactures both main computers and peripherals, and particularly alphanumeric mosaic printers with a capacity of 250 characters per second as well as cassette memories for SM EDC. The scale of development of the computer industry in Poland is evidenced by the fact that the MERA-BLONIE Plant alone has increased its exports by a factor of 16 during 1970-1975.

As seen from these examples, the countries participating in the agreement specialize in the manufacture of different entire equipment units, though of course this does not preclude specialization in the manufacture of subassemblies--e.g. junctions (GDR), magnetic heads (Bulgaria, Poland), alphanumeric keyboards (Czechoslovak SSR), etc.

To an increasing extent the Intergovernmental Commission and its agencies tailor their activities to the problems of utilization of computer science. The cooperation plan already includes more than 140 applications of YeS and SM EDC. This work proceeds in two directions: utility-program packages (UPP) are being developed for scientific and engineering computations and for management systems. Bulgaria is working on UPP for design computations of girders, frames, and bridges. In Hungary, programs for recording, systems analysis and effectiveness analysis of computers and computer centers are being worked out. The USSR acts as the coordinator of the work to develop UPP for operative management of basic production in machine building plants. UPP for the technical preparation of production are being developed in the Czechoslovak SSR.

Utility programs for the automation of design and technological solutions are being developed at 137 centers in the countries participating in the agreement, inclusive of 43 Soviet centers. The programs are designed to solve problems of heat transfer, materials technology, and the design of subassemblies and components of machinery. About 20 packages represent programs for design bureaus of urban, industrial, and power construction. More than 40 programs are being developed for design and technology bureaus, instrument-making, and the electronics and radio engineering industry. The new developments include UPP designed for the analysis and parametric optimization of linear and nonlinear electronic systems, gear-transmission computations, the development of electrical control systems, technological equipment, the design of induction motors, and others. The UPP developed in the Soviet Union facilitate, e.g. the design and technological assurance of the production of electronic and thin-film hybrid circuits, industrial control and monitoring devices, and two- and multilayer printed circuits.

The Joint Library of Utility Program Packages of the countries participating in the agreement has been established. These packages are utilized by thousands of users. The labor requirement of the introduction of finished UPP as regards engineering calculations is only one-sixth to one-twelfth as high as that of individually developed programs, and in the case of systems packages, it is only one-third as high. As a result, the savings produced by the introduction of the Joint-Library UPP are estimated at about 200 million rubles.

In the course of their implementation of the uniform plan for cooperation in applications of information science the member countries of the Intergovernmental Commission developed UPP for standard management subsystems in industrial plants, including the subsystem "management of Basic Means of Production," developed in Hungary. The "Data Bank Control System" was developed by scientists in the GDR. The subsystem "Production Quality Control" was designed in the Socialist Republic of Romania and "Management of Labor and Wages" in the Czechoslovak SSR.

The utility programs developed for the SM EDC minicomputers pertain to such problems as the real-time mode and man-machine dialog, and they assure teleprocessing and the processing or graphics, statistical, and dispatching data, Table: Principal Technical Parameters of First- and Second- Series YeS Computers

Model (1)	Producent (2)	Seria (3)	Szybkość [tys.op./s] (4)	Pojemność pamięci operacyjnej [Kbajt] (5)	(6) Kanały			
					(7) multipleksorowe		(8) selektorowe	
					liczba (9)	(10) przepustowość [Kbajt/s]	liczba (9)	(10) przepustowość [Kbajt/s]
(*) EC 1010	WRL (12)	I	3	64	1	16	—	—
EC 1012	WRL	IM 1)	6	128	1	20	—	—
EC 1015	WRL	II	12—16	160 2)	1	20	1	300
EC 1020	ZSRR, LRB (13)	I	10—20	256	1	16	2	300
EC 1021	CSRS (14)	I	20	564	1	25	1	250
EC 1022	ZSRR (15)	IM	80—90	512	1	80	2	300
EC 1025	(16) CSRS	II	60	256	1	24	1	600
EC 1030	ZSRR, PRL (17)	I	60	512	1	40	3	800
EC 1032	PRL (18)	IM	200	512	1	40	3	400
EC 1033	ZSRR	IM	200	512	1	70	3	600
EC 1035	ZSRR, LRB	II	140	512 2)	1	30	4	800
EC 1040	NRD (19)	I	400	1 024	1	50	6	1250
EC 1045	ZSRR, PRL	II	500	3 072 2)	1	40	5	1300
EC 1050	ZSRR	I	500	1 024	1	110	6	1300
EC 1055	NRD	II	600	2 048 2)	2	40	4	1200
EC 1060	ZSRR	II	1300	8 192 2)	2	110	6	1200
EC 1065	ZSRR	II	4500	16 384 3)	2	200	11	1500

11)

Uwaga: 1) IM — seria pierwsza zmodernizowana
2) Komputer jest wyposażony w pamięć wirtualną
3) Komputer jest wyposażony w pamięć wirtualną oraz kanał multipleksorowy blokowy

Key: (*) EC = YeS

1) Model
2) Producer
3) Series
4) Operating speed (thousands of operations per second)
5) Direct-Access Memory Capacity (K bytes)
6) Channels
7) Multiplex
8) Selector
9) Number
10) Capacity (K bytes/second)
11) Note:
    1) IM--modernized first series
    2) Computer equipped with virtual memory
    3) Computer equipped with virtual memory and multiplex channel unit
12) Hungarian People's Republic
13) USSR, People's Republic of Bulgari
14) Czechoslovak SSR
15) USSR
16) Czechoslovak SSR
18) Polish People's Republic
19) GDR

as well as their utilization for teaching processes. Plans exist for the development of complete translating routines serving to develop at minimum cost software for SM EDC on computers of the Uniform System.

Experience shows that use of UPP reduces to one-third to one-fifth the duration of the various machine design stages and to one-fifth to one-tenth the duration of the preparation of technological processes. It then also is possible to reduce the capital requirement of construction by 20-30 percent and to improve by 10-25 percent the economic indexes of design work.

The countries participating in the agreement develop new UPP at an increasing rate. The rules of the Intergovernmental Commission provide for the development of several hundred UPP by the year 1980, which will cause the contents of the Joint Library of Utility Program Packages to exceed 5 million instructions.

To improve performance indexes, national organizations for comprehensive computer maintenance have been set up in the CEMA countries. These organizations design computer centers, equip them with computer hardware, and handle installation, testing, and inspections. The activities of the maintenance services are regulated by technical standards drafted by the Intergovernmental Commission.

Computer training centers also have been set up in the CEMA countries. The Working Group for Training happens just now to be developing materials which will assure standardization of the training of YeS computer maintenance personnel. Uniform programs for the training of computer scientists already are mandatory at the higher educational institutions of the CEMA countries. Multinational teams of authors are developing textbooks and manuals. This assures an effective utilization of digital computers as well as uniform design principles for new equipment and a high level of training.

The success of the first program for international cooperation has enabled the countries participating in the agreement to develop the second program for specialization and cooperation in the design, production, and utilization of computers for the period until 1990. New computers and peripherals will be even more reliable and productive and will incorporate the latest developmental trends of computer technology, including opto-electronics, holography, and many others.

1386
CSO: 2602

USE OF RADIOACTIVE ISOTOPES IN AGRICULTURE

Tirana ZERI I POPULLIT in Albanian 23 Feb 80 p 3

[Article by Agrikol Gjermeni, chemist at the Institute for Soil Studies: "The Use of Radioactive Isotopes in Agriculture"]

[Text] The radioactive agronomical methods which result from the use of radioactive isotopes in the field of agricultural research are bringing to light new information on the physiological and metabolical processes in plants, creating the possibility to define correctly the natural productivity level of the soil, the movements of moisture in the soil, as well as the factors which influence an increase in the yield of agricultural crops. In our country, scientific research and studies in the field of radioactive agronomy encompass a number of problems which are caused by our expanding socialist production. After the successful completion of agrochemical and pedological soil studies our agricultural economies today work by agrochemical and pedological maps, which help to raise the effectiveness of fertilizers and agricultural work. It was precisely in this important activity that the need was born to use radioactive chemical methods which use radioactive tracers.

For some years now a radioactive unit has been functioning at the Institute for Soil Studies. The purpose for installing this unit was to help solve certain problems, primarily two problems: one, to find the ability that these methods have to help us come to quick conclusions; two, to see whether they will give us more accurate data than the old traditional methods.

The advantages these methods have are derived from the fact that the problems under study can be quickly isolated from other factors, in addition radioactive chemical measurements are easier and much faster to make than chemical measurements.

The Institute for Soil Studies, in cooperation with the different economies in the country, has targetted for solution certain agronomical problems by using radioactive isotopes. One of them, for example, is to raise the coefficiency of phosphates. This was the objective of the study of an experiment on the terrain with data collected in the laboratory by radioactive tracers. Based on these data the effectiveness of phosphates should increase, if the fertilizer were spread on localized areas. As always the accuracy of the measurements and the conclusions must be proved on the field. The experiment that was set up by the agricultural cooperative of Selenice completely supported the speedy conclusions obtained in the laboratory when using radioactive phosphates. The fully localized use of superphosphates at the time of planting resulted in an increase of 3.31 quintales of wheat per hectar, as compared to the yield realized in areas where fertilizer was spread by the usual methods, therefore the coefficiency from the use of the fertilizer, per handful used, increased by 5 percent. We believe that the use of sowing machines, fitted with the two containers, one for the seed and one for the fertilizer, and spreading the superphosphate at the sowing stage, rather than the vegetative stage are two measures that increase the coefficiency of phosphates.

Of equal importance is the problem of how to fertilize fruit trees, and how to make the greatest use of fertilizers which are used for this purpose. Knowing that some fertilizers do not move in the soil (phosphates) while others spread rapidly (nitrates), and knowing that the root system of fruit trees is fairly broad, we are faced with the question: how to fertilize fruit trees and how to spread the fertilizer in order to have the greatest coefficiency from the use of fertilizers.

With radioactive isotopes, within a short period of time, it was possible to define some of the principal criteria necessary for fertilizing fruit bearing trees. By using radioactive phosphates the root system of fruit trees was effectively defined in depth and width in order to find the most effective areas for localized fertilization. These areas in themselves represent that volume of soil where root activity is most intense. The measurements that were completed showed that this area is not specifically just for the crops that were studied (grape vines, olives, citrus fruit and others), but changes very much depending on the age of the crop, as well as on the type of soil.

The experiments that were made on the terrain, in cooperation with the agricultural enterprise "Bregdeti te Lukoves" (Shores of Lukove) for olive trees, and those with the agricultural enterprise "Gjergj Dimitrov" for grape vines, to see the positive effects of this kind of fertilizer to increase the productivity of the above mentioned fruits, proved once more the accuracy of the measurements and the conclusions derived in the laboratories of the Institute of Soil Studies while working with radioactive isotopes.

Recent work has shown the necessity to study with radioactive isotopes the movement of water in the soil and its drainage capability. The contribution from these studies in this field has been great, not only for the well-known fact that the experiment can be accomplished in a short period of time, but also for the fact that investments for this method are minimal.

With radioactive isotopes the distance and depth of soil drainage can be defined, and depending on the quantity of rain and the weather a determination can be made whether the tractors can be sent into the field; the movement of moisture above and below ground can be determined, etc. In our country, the land surface with good drainage increases more and more everyday. As drainage material, in conjunction with ceramic drainage pipes, different on-site materials are used. One of the materials that can be used is crushed gravel. The pouring of gravel in the drainage ditches has been completely mechanized by the SMT (Stacion per Maquina e Tractor-Station for Machines and Tractors) in Lushnje. Determining the obsolescence (the period of function) of this type of drainage ditch is of interest on an agronomical basis, and of economical benefit; the fact that the work is mechanized saves manpower, ceramic pipes, and so on. The objective of an experiment by the Institute of Soil Studies, in cooperation with SMT in Lushnje and the "Ylli i Kuq" (Red Star)NB (Ndermarje Bujqesore-agricultural enterprise) in Kazme is to define this kind of drainage ditch.

After solving some laboratory related matters, such as finding the isotope suitable for this purpose, defining its activity during its use on the terrain, defining the amount of water in depth and the speed at which it travels in this kind of drainage ditch, an experiment was set up to study this type of drainage system in the area of Laknas. The final answer concerning the life expectancy of this kind of drainage ditch, and the type of soil in which it has been dug will be available in 6-7 months. We emphasize this matter, because if this problem were to be solved by the traditional agronomical methods it would take several years.

Studies defining the natural fertility of soils, with P2O5 as a responsible index, showing the action of the fertilizer and the kind of harvest it will yield present an interesting aspect. The methods which are used today for this purpose have certain weaknesses. They depend on the type of soil, its acidity and the type of crop that will be sown, and so on, whereas, the radioactive chemical method excludes these weaknesses. While following the rules of isotopic refinement and making a chemical and radioactive chemical analysis of the plant, we find a method which gives us a very valauble index, by which we can correctly define three basic parameters. The following can be accurately defined: the natural fertility of the soil, the amount of fertilizer that has to be used based on planned productivity, finding thus the applicable chemical extractor(?) which should be used for this or that type of soil. With this method we have successfully completed the study of certain soils that are typical of the district of Tirane, of the black soils in the districts of Lushnje and Fier, of magnesium salted soils and others. The laboratory of radioactive agronomy is faced with certain new problems which preoccupy our agriculture. As such we can mention the very effective ways that have been found to use three kinds of azotemic fertilizers which we dispose of; define the time of fertilizing different crops; prevent erosion. We have found a very beneficial way to use a combination of drainage systems; ways to fertilize and the right ways to define the microelements in the soil, and so on. These and the problems which surface as a consequence are actual duties for our agricultural productivity, and as a result demand a quick solution. Their rapid and complete solution will shorten the passage from the study phase to the implementation for production phase. Real possibilities exist, as does the necessary material and technical base, actualized in the Institute for Soil Studies, as well as in the responsible institutions in the Academy of Sciences.

6160
CSO: 2102

CURRENT RESEARCH, ACHIEVEMENTS IN BIOLOGY OUTLINED

Sofia ZEMEDELSKO ZNAME in Bulgarian 18 Apr 80 p 3

[Article by G. Sveshtarov, chief of the Planning and Application Department of the Bulgarian Academy of Sciences Joint Center for Biology: "Biology in the Service of Life"]

[Text] The last 25 years of our century are a true "golden" age in the development of biology as a whole and of molecular biology in particular. The genetic code of organisms was broken. The material carriers of heredity--certain genes--were synthesized in an artificial environment and gene engineering is performing real miracle before our very eyes.

Against the background of the great and impressive accomplishments of the world's biological science, the developments of the scientific research units within the BAN [Bulgarian Academy of Sciences] Unified Center for Biology are noteworthy. They are doing successful work on important problems which shape a large part of the scientific research conducted by our institutes. At the same time, a number of studies of basic-applied and applied nature are being conducted in specific sectors in agriculture, forestry, industry, health care, etc.

The institute's activities are guided by the basic strategic task of linking ever more closely science with practical work and converting it into a decisive production force in the socioeconomic development of the country, formulated in the decisions of the 11th BCP Congress, the BCP Central Committee Politburo decision on the development of the biological sciences in Bulgaria, and the July 1978 BCP Central Committee Plenum.

The Molecular Biology Institute of the center is engaged in extensive studies of the structure, biological characteristics, and functions of proteins and nucleic acids. Our specialists have achieved exceptionally interesting results which clarify the mechanisms of the manifestation of the genes in the cell and the regulatory role of chromosome proteins. In most general terms, one of the main tasks of this institute is to clarify the molecular mechanisms of cellular differentiation and its disturbances which lead to a malignant degeneration of the cells, one of whose forms is cancer. Work is also being done to synthesize compounds which, eventually, could influence the genetic activity of the cell. In the area of gene engineering a new DNA molecule was developed (a recombinant DNA molecule) carrying the gene of the enterotoxin of the Escherichia coli intestinal bacillus. A bacterium which greatly increases the output of enterotoxin, a specific protein, was developed. It is promising in the development of diagnostic and prophylactic antiserum.

Important theoretical work on noninfectious immunity has been done by the Institute of Biology and Immunology of the Multiplication and Development of Organisms. The work proved that a complex nerve-humoral immune regulation and coordination has been developed to control vital processes in the organism of mammals and man. The study of the structure and effect of the various noncontagious antigens and antibodies, and the effect of the developed immune bodies are already being extensively applied in human medicine and animal husbandry, in the prevention of allergies, and in tissue and organ transplants.

The scientific personnel of the Institute for General and Comparative Pathology have made original contributions to the theory of the viral cancerogenesis. The isolated original viral strains PTS-26 and PTS-26E have caused bone tumors in birds and show all the basic characteristics of the group of leucocyte viruses.

Interesting results have been achieved in the determination of the characteristics, structure, and metabolism of the nervous system of some lower vertebrates. One of the major problems on which the scientific workers of the Central Regeneration Laboratory are working is the following: Why is it that a nerve fiber of the central nervous system is not regenerated, when cut off in the case of higher vertebrates and, particularly, man, while it is regenerated in the lower vertebrates.

Along with basic scientific problems researched at the institutes and the central laboratories of the BAN United Biology Center, a number of applied results have been obtained.

The Molecular Biology Institute has synthesized the preparation "Cydrin" which has shown a strong antitumor effect in animals. The preparation has passed all preliminaary tests and has been submitted to the Ministry of Public Health for preclinical tests.

The scientific personnel of the Genetics Institute have completed their studies of various types of male sterility and [sic] their suitability for hybrid seed production. The result has been the development of hybrid tomato strains applied in agroindustrial complexes, yielding considerable economic results. Extensive genetic and citogenetic studies of tritikale interspecies hybrid have yielded substantial results. A number of promising forms of tritikale have been developed, distinguished by high yields, resistance to rust, and high content of proteins and lysin, an amino acid important to the animals' organism.

The plant physiology institute has synthesized new carbamide derivates with citoquinine characteristics, with good possibilities for practical use. The method for the use of meristematic cells of raspberry and black-currant, developed by the institute, is of great importance to fruit gardening in the development of virus-free planting materials.

The studies conducted by the Institute of Biology and Immunology of the Multiplication and Development of Organisms on the role of acrosine in male sex cells are of practical importance. Such studies are very important to resolving the problem of the deep freezing of the seminal fluid used in sheep breeding. The possibility has also been developed to create vaccines for the nonsurgical castration of animals.

The Forestry Institute has completed a number of scientific projects related to the mapping of forest plants, the selection-genetic foundations of the organization of forest resources, the development of seed plantations for forest-industrial crops, biological methods for the struggle against pests in forest plants, and others.

Problems included in the comprehensive programs for Blagoevgrad, Kremikovtsi, Strandzha, the Bulgarian shore of the Danube River and the Black Sea coast, and so on, as well as the tasks assigned by the State Council and the Council of Ministers, as social assignments, play an important role in the work of the United Biology Center in providing specific assistance to practical workers. We have provided valuable scientific assistance to a number of okrugs.

This comprehensive and varied activity of the center convincingly proves the unbreakable link between basic and applied research. That is why, in the future as well, the scientific personnel of the institutes and central laboratories will continue to work along the main strategic directions of the biological sciences in order to properly answer the party's appeal for even more effective and better quality biological research in our country.

5003
CSO: 2202

ELECTRONIC TAXI METER DESCRIBED

Sofia VUNSHNA TURGOVIYA in Bulgarian No 3, 1980, inside front cover

[Information: "The Eltaks 10 Electronic Taxi Meter"]

[Text] The meter records the amount charged to the client, the total length of the trip, the length of a trip taken with a hired motor vehicle only, the number of charged passengers and the number of recorded meter units. The Eltaks 10 is based on a microcomputer with a big MOS of integrated circuits. The current account of the customer is shown with a five-digit, green, lighted display. The information on the basis of which the driver presents his account is accumulated in electric counters where it is reliably stored even without electric power.

The Eltaks 10 can charge for services according to three rates. The initial rate and the rates and amounts related to the type of motor vehicle may be reset easily and conveniently. The resetting is accomplished by changing the firm connections in the code field. A certain distance or idling may be prepaid with the initial fee. The figures of the latter are fed to the code field.

The Eltaks 10 is connected to the motor vehicle by a photographic meter. The meter is small and lightweight. It mounted between the speedometer and its cable.

Exported by the Izotimpeks Foreign Trade Trust, 51 Chapaev Street, Sofia, Bulgaria. Telephone: 73-61. Telex: 022732, 022731.

5003
CSO: 2202

SOLAR OBSERVATION SATELLITE LAUNCHING SCHEDULED FOR 1981

Prague MLADA FRONTA in Czech 12 Apr 80 Supp p 3

[Article by Karel Pacner]

[Text] The era of terrestrial astronomy is slowly coming to an end; in the next century, space, though it may sound like a paradox, will be observed exclusively from space -- from artificial satellites, orbital bases, from the moon... That is at least what is maintained by many renowned astronomers.

Our atmosphere actually acts as a veil,which is impervious to selected radio waves travelling from space to Earth's surface, and also obscures terrestrial observations using optical telescopes. Thus, study of space from space opens up entirely new possibilities, the likes of which astronomers did not even dare dream in the past. It stands to reason that if Czechoslovak astronomy could not avail itself of the Interkosmos project to send its instrumentation into orbit it would start lagging behind the rest of the world.

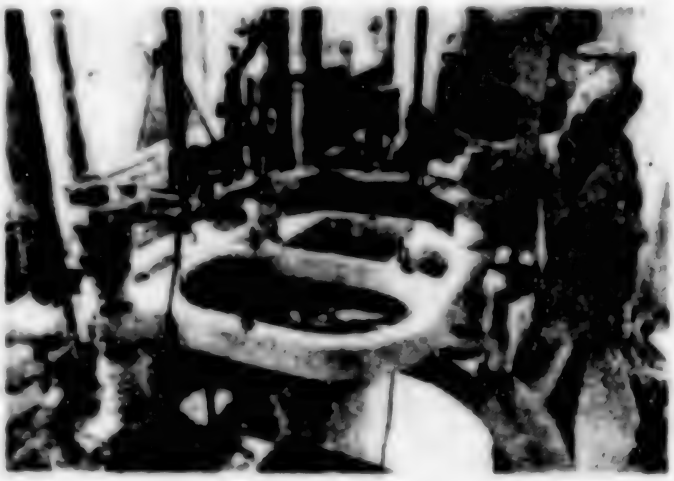
Simplification of a Complex Problem

Of course, the entry of astronomy into an extraterrestrial medium brings along a number of new technical problems. One of them is currently being dealt with by Czechoslovak experts. Some 10-15 years ago, a satellite capable of monitoring the solar disc for a period of several minutes while orbiting the Earth was a minor miracle.

"Nowadays that won't suffice any more," says Dr Boris Valnicek, Cand.Sci., head of the laboratory for space research at the Astronomical Institute of the Czechoslovak Academy of Sciences in Ondrejov near Prague. "We need a satellite which could monitor not just the Sun in its entirety, but also its selected sections. It's all very complex. To date we have no technical means at our disposal that would allow us to accomplish such orientation. Our Soviet colleagues came up with the idea of orienting toward the Sun not the whole satellite, but only a part of it -- a small platform with instruments that require such precise targeting. A mere idea thus simplified a complex problem. It is a solution that offers many advantages as regards energy and is also more feasible technically, even though -- I have to admit -- it is still very demanding. Our designers, headed by engineer Jiri Recek from the Developmental and Operational Base for Research Institutes in Prague-Bechovice, came up with so progressive a concept that, in the end, the Soviet experts asked us to go ahead and develop the entire platform."

Ingenuity Came Through Once Again

The first sketches of the platform date back to early summer of 1974. Today its prototype is undergoing tests. The oriented platform with unorthodox configuration of the instrumentation frame installed on tubular girders with hydraulic drive sits atop the test stand. The two astronomical instruments, for which it is being developed, are simply inserted into a socket in the frame casting. And next to it is the electronic "brain" of this system, which will be located in the satellite.



Engr Recek showing us the oriented platform clamped to the test stand

"The platform travels along two axes," explains Engr Recek. "The original requirement called for stabilization precision of up to twenty angular seconds; in the end we managed to get it down to mere five seconds. To put it more graphically: one second of servomechanism displacement represents a lift on the order of 0.0033 of a millimeter. And that, under difficult space conditions, is great precision. It could perhaps be compared to the precision required in the production of selected microelectronic components. And, conversely -- this precision is equal to tolerances that are used, let's say, in work with machine tools."

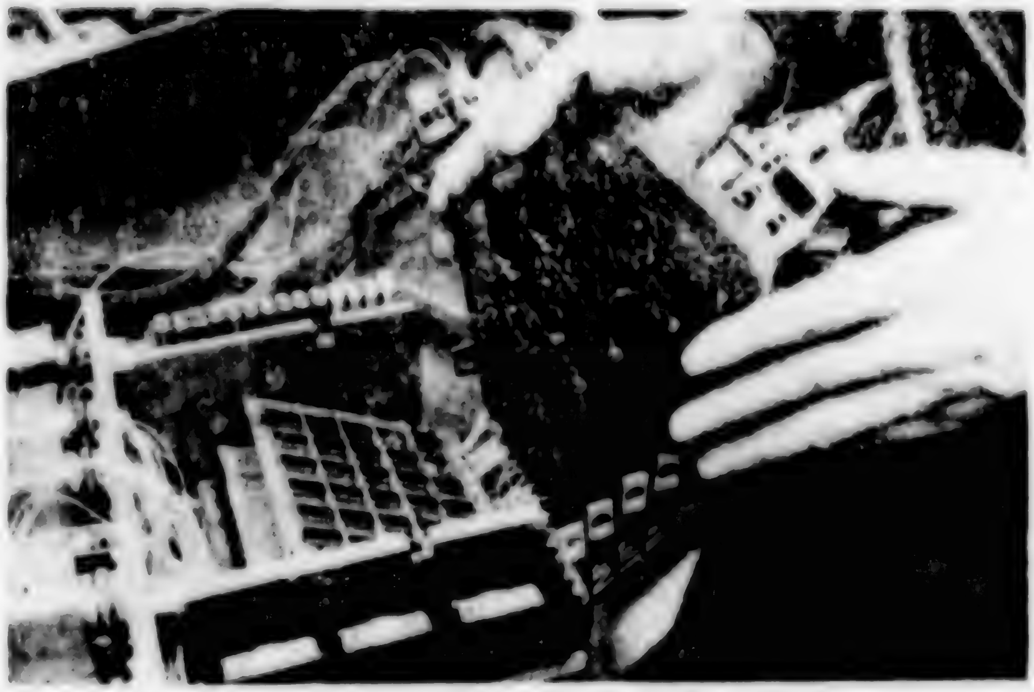
It was specifically the attainment of such precision that presented the greatest problems. The engineers from Bechovice were not in need of any new inventions -- the fine and precise lift of the servomechanisms is provided by ball screws from the Machine Tool Production Plant in Kurim, and the same effect is achieved by an ingenious delineation of tolerances for other moving parts. And electronic functioning is based on precision signals from solar sensors of their own original design.

Hierarchy of Priorities

While the development of the mechanical part of the project was supervised by Engr Recek, the no less important electronics part was the domain of Engr Jiri Ruzicka, who worked out the structure of systems and designed the servomechanisms. Somewhat later the design team was joined by Engr Frantisek Rubes who devised the system of built-in automatic control of the platform in space.

"The basic program of the platform consists of four operational programs," elucidates Engr Rubes. "In the first two cases, the orientation of the platform with an x-ray spectroheliograph and an x-ray telescope alternates from the center of the Sun to an overall survey -- in shop talk we call it scanning, meaning in this case a large scan. Further, the platform focuses its instruments on a selected part of the solar disc where its task is to perform a so-called small scan. All this is repeated at regular intervals. In addition, the satellite contains a measuring system which registers each larger eruption and gives the command to interrupt all ongoing activity and focus the instruments on the turbulent region. Routine operation can also be substituted by some extraordinarily interesting observations on command from the Earth.

All commands have been arranged into an entire hierarchy of precedent and subordinate tasks -- the highest priority accrueing to the control center, followed by solar eruptions."



The electronic "brain" which will control platform functions

The ambition of the engineers was to assemble the platform primarily from Czechoslovak components. They succeeded in their efforts -- only a few electronic elements that are not produced domestically had to be imported.

Both Crossing and Robots

Foreign plants that produce instrumentation for space engineering often boast of new methods, products and such, which were originally developed for space, but found immediate application in terrestrial uses. Thus, we started to contemplate with engineers Recek and Rubes what methods or elements the oriented platform can offer to our industry.

First of all, the electronic "brain" designed for control of priorities would be eminently suited for control of crossing lights. By means of suitable sensors it would be possible to determine the number of cars on main and side streets and let them proceed accordingly, with the highest priority being assigned to preferred vehicles, ambulances, firemen and police... The two designers could not quite agree on whether the system could be used for control of manipulator-robots in industry. But there is a possibility that they could find application in the control of multipurpose robots that are to provide help in production and in households in the future.

Some new production processes for special titanium parts which had to be developed could find application in both the chemical and optical industry. Servocylinders from INOVA Prague, designed for precise reproduction of the oscillating motion of the satellite on the test stand, showed once again that our industry too can produce demanding electrohydraulic components which could find a number of terrestrial applications.

And if the results, attained by the space technology group of the Developmental and Operational Base for Research Institutes in Bechovice and their partners in other institutes and plants in the development of the oriented platform, were to be given further thought, we could come up with additional applications. At any rate, it is quite possible that someone somewhere is already contemplating this subject.

The prototype of the oriented platform recently passed joint tests with a new telemetric system developed in the GDR. Two more sets -- one for flight use and one as reserve -- are currently being produced in Bechovice. If all operations proceed according to plans, the first satellite using this unique system unparalleled in the world could be launched into space by next year.

8204
CSO: 2402

GRAIN SILAGE IN STEEL TOWER SILOS

Prague MECHANIZACE ZEMEDELSTVI in Czech and Slovak No 2, Feb 80 pp 69-73

[Article by Eng Jan Viska, of the Sectoral Enterprise of the Viticovice Klement Gottwald Ironworks and Machinery Plant]

[Text] With the steady increase in grain yields per hectare, and the application of high-production harvesting equipment socialist agricultural enterprises are encountering the problems not only of how to process large quantities of grain rapidly and with high quality, but above all, of how to store grain in such a way as to minimize losses and to fully mechanize handling work in the storage process. With the conventional method of storing grain, at the time of harvesting its reception and storage is an obstacle to complex harvesting, the grain has to be stored temporarily in fenced-off areas, and when the weather turns bad it has to be transferred and stored. This method means not only additional costs, but also undesirable losses.

At some agricultural enterprises grain is currently stored in various provisional storehouses, in former grain lofts, where it is impossible to take full advantage of mechanization in handling operations. In addition, the maintenance of roofs and entire structures offers no guarantee of quality storage since leaks often occur and the grain spoils. Not least in importance is the fact that the dispersion of storage facilities makes control difficult, and losses occur during handling, i.e., during the transport of grain, and it is also impossible to put a complete stop to the pilferage of grain, since in these grain lofts the proportion of manual operations is significant. The outlays for conventional storage are high, and with a manpower shortage they are difficult to cope with. Filling conventional storehouses is a long and tedious operation because the only transport is pneumatic, i.e., by means of grain slingers, and the capacity is extremely low.

Together with the increase in yields per hectare, it is also absolutely necessary to solve [the problem of] improved grain storage and thus to prevent losses, which are not insignificant.

In dry weather, when the capacity of the cleaners in the agricultural enterprises is insufficient for processing the active harvest, the grain is supplied directly to the storehouses of the agricultural procurement and supply enterprises. From the financial standpoint, therefore, the needed sales do not take place, which is unprofitable for the agricultural institutions.

Only large grain storehouses can solve this problem, which is especially burdensome in combined agricultural enterprises.

One of the tasks in fulfilling the resolutions of the 15th CPCZ Congress is guaranteeing high-quality grain storage. In the draft guidelines for economic and social development of the CSSR in 1976-1980 it is directly spelled out: "In agricultural supply and procurement the construction of large silos with grain storage capacities for an additional 1.6-1.8 million tons shall be achieved." On the basis of the guidelines of the CSSR Ministry of Agriculture and Food, the construction of 250 large storage facilities in agricultural enterprises is called for during the course of the Sixth Five-year Plan.

The agricultural enterprises making decisions on the construction of new storage facilities may basically choose these solutions:

Large-capacity silos, mainly concrete, designed especially for the needs of agricultural purchasing and supply enterprises (for agricultural enterprises, they would perhaps be useful for cooperative districts); their realization is hampered because of the considerable amount of construction work carried out by specialized construction enterprises.

Storage halls, of which the most widely used are the Bios, with wooden support structures; in addition to this, various [pre-] assembled steel halls (steel sheds), or halls of prefabricated concrete sections are being offered. In spite of the simplicity of construction this storage method should not be regarded as one offering long term possibilities, chiefly because of operational considerations, since the handling of the grain requires considerable machine and manual labor; it is also possible for losses nad for the mixing of various types of stored grains to occur. It is difficult to use these storage facilities on a multipurpose basis. The storage of grain generally lasts until winter, so that the storehouse is not freed in time for other applications. The construction of covered areas for current storage can be carried out considerably more cheaply than that of premises encumbered by stored grain.

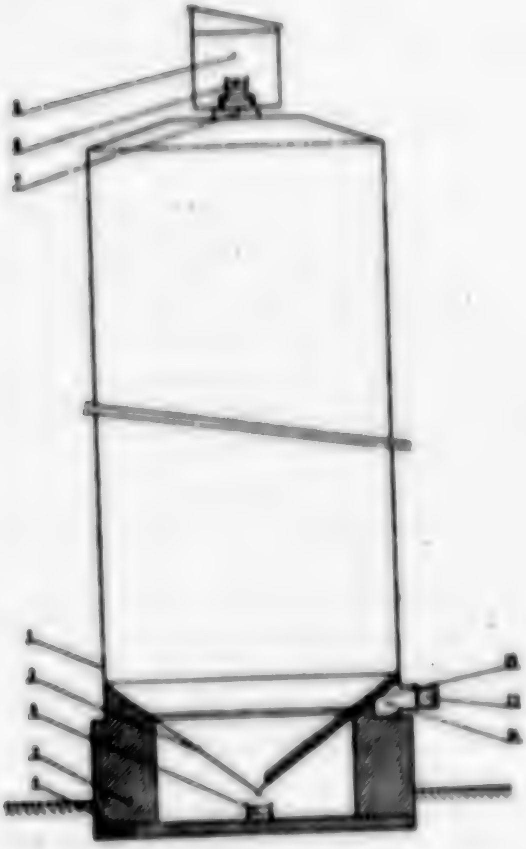
Currently Unused Facilities, which sometimes can be adapted and used for storage. However, it is always necessary to consider carefully whether a facility suited for the intended purpose is obtained for the money spent. In the majority of cases, it is determined later that the grain handling cannot be fully mechanized, the structure of the building cannot be loaded with the proposed quantity of materials, the storage level is inadequate, etc., so it turns out that a new, mechanized storage facility with long range prospects could have been built for the monies expended.

Metal Tower Silos, which are built with cylindrical, square, or hexagonal bins, out of sheet steel or aluminum sheet. Since this involves a nontraditional method, there is insufficient experience wiht their use on a wide scale. There is no uniform opinion on their implementation. The dangers are pointed out that under the influence of the surface temperatures of the metal plate wall, the quality of the stored grain is lowered, that it is difficult to control the condition of the stored grain, that the maintenance of the jacketing is very expensive, etc.

Even if the problems of storing grain in metal silos required extensive evaluation, it can be affirmed with justification that when the basic grain storage and ventilation rules are adhered to, the grain quality is not reduced even during long-term storage. This is also borne out by the experience gained both in our country and abroad, where this method of storage is being considerably expanded after many years of experience. The use of metal tower silos is advantageous for agricultural enterprises for these reasons:

The sectional system consisting of individual bins with considerable variability in storage capacities means they can be used for threshing lines where they serve as bunkers for handling grain from threshing machines, bunkers for the operation of driers, waste bunkers, short-term dispatching bunkers etc. Furthermore, by combining individual bins it is possible to assemble storage space of any capacity for long-term grain storage as a component of the threshing lines, and on occasion, as an independent central storage facility for cooperative districts.

As for the construction of the silo, this is essentially a matter of installing individual elements provided by the manufacturer, which lowers the construction time to a minimum. Experience shows that with good organization it is possible to master the construction of silos in one year. Construction work is mainly limited to the foundation slab, and if need be, to the receiving section, so that many agricultural enterprises will be able to handle it using their own resources.



Obr. 1. Řez buňkou na 1000 t.

Figure 1. Cross-Section of a Bin for 1,000 Tons

Key: apply to all figures:

1. Bin Wall
2. Steel unloading hopper
3. Circular landing
4. Foundation slab
5. Conveyer bridge of the filler conveyer
6. Moveable-belt filler conveyer
7. Intake grate
8. Belt unloading conveyer
9. Receiving hopper platform

10. Receiving hopper

11. Bucket filler conveyer

12. Belt unloading conveyer

13. Receiving section roof

14. Dispatching bunkers

15. Baffle plate

16. Unloading conveyer passage

17. Lower head of the bucket unloading conveyer

18. Connection pipes with stoppers

19. Upperhead of the unloading conveyer

20. Upper head of the filler conveyer

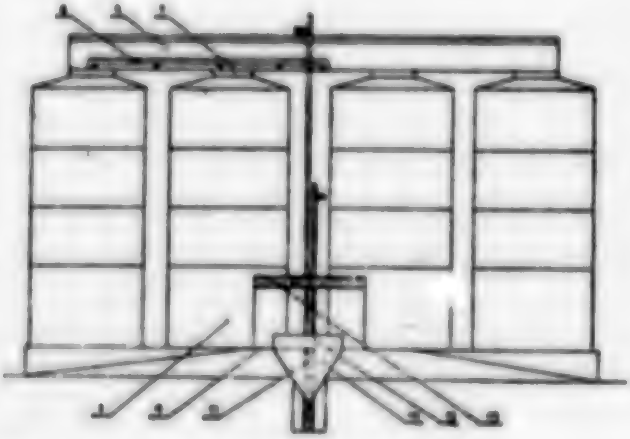
21. Gravity pipes of the filler conveyer

22. Operating position

23. Forced ventilation air vent

24. Circular channel

25. Radial forced ventilation chamber



Obr. 2. Technologie plnění.

Figure 2. Technology of Filling Operations

The concept of tower silos reduces the requirements for building site area. Grain handling can be mastered with available transport mechanisms without manual labor. The operation of the storage facility is also reduced to control of operations, inspection and maintenance.

Equipping the bins with suspended thermometers for continuous control helps to maintain the high quality of the grain stored.

The conveyer layout makes it possible to treat the grain by passing it between individual bins. Recently, forced air ventilation has been introduced, and its advantages can be put to good use in tower silos.

Several producers in the CSSR are engaged in the manufacture and installation of steel tower silos.

The Milling Machinery Plants in Pardubice are building silos consisting of cylinderical steel bins with cone hoppers, with externally-insulated walls for large-scale storage facilities.

The Kraj Maintenence Shops of the Agricultural Purchasing and Supply Enterprises in Uhlirske Janovice, are installing steel silos [consisting] of flat sections of square or hexagonal bin cross sections and cone hoppers.

The Unified Agricultural Cooperative of Kremesnicko is producing steel sheet bins made with flat bottoms which are wound in spiral form according to the Lipp system.

The Zachlumi workships of the Tachov State Farm, produce bins made out of screw-mounted panels of galvanized sheet metal.

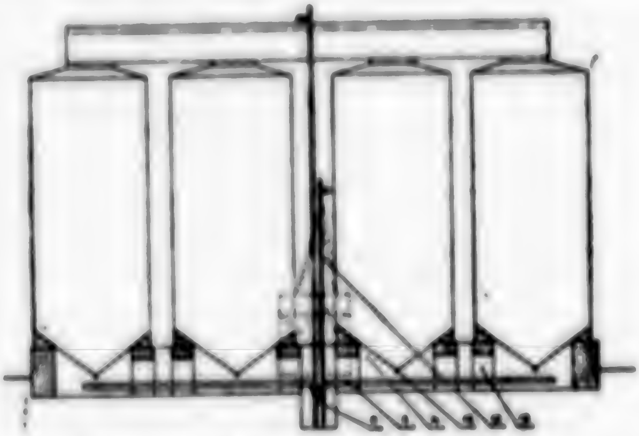
We imported aluminum bins from the GDR manufactured by VEB Pelkus.

The Klement Gottwald Iron Works and Machinery Plant in Ostrava, a sectoral enterprise of Vitkovice, has been producing steel towers for a number of years, which are designed basically for hayage and silage. The experience gained has made it possible to use them for storaging other materials, for example, liquid fertilizer and manure, liquified multicomponent fertilizers, granulated dried materials, wood-industry waste, sewage-disposal-plant residues, etc.

The wall plates of all towers and tanks are screw-fastened from sheets measuring 2,740 and 1,480 mm, from 3 to 5 mm thick, and bent in accordance with the desired tower diameter. The tower roofs are assembled from sections fastened with screws. All the plates and roof components of the tower are coated on both sides with an acid-proof enamel resistant to mechanical damage. The tower panel requires no maintenance whatsoever during its service life (a minimum of 40 years). The tower components are produced by the point technology, for example, the screw holes in the wall-plate sheets are punched on program-controlled single-purpose machines. This makes it possible to line up the holes according to the requirements for the mechanical properties and the tightness of the plates. The same kind of automation of the production of enameling lines insures the high quality of surface enamels.

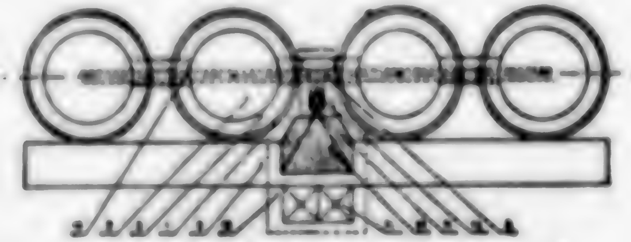
Considerable attention was devoted to the possibility of storing granular materials, especially grain.

The first tests with modified havage towers have led to the currently produced steel towers (bins) 6 m in diameter, which have an overall height of 21.8 meters and a storage capacity of 400 tons. The bins can be equipped with steel unloading hoppers with unloading cone angle of 40 degrees for grain, or 57 degrees for dry materials. The individual bin with unloading hopper is installed on a supporting structure, which is formed by a steel ring with supports. Towers of this type have been supplied to agriculture for several years now, especially to agricultural supply and procurement enterprises. As an innovation, these towers are equipped with unloading hoppers with an air-vent system for forced-air ventilation.



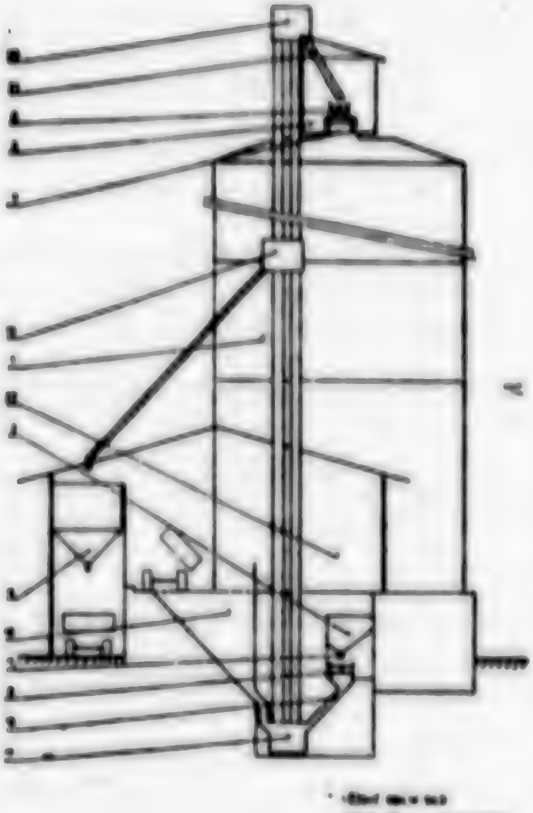
Obr. 3. Technologie vyprazdňování.

Figure 3. Technology of Unloading



Obr. 4. Půdorys věžového obilního sila.

Figure 4. Ground Plan of a Tower Silo for Grain



Obr. 5. Technologie příjmu a expedice.

Figure 5. Technology of Receiving and Dispatching

Recent experience confirms that even these towers do not have sufficient capacity for the requirements of large agricultural enterprises and agricultural procurement and supply enterprises, and that it is more advantageous (especially for lowering investment outlays for storage) to switch to higher storage capacity of bins. Therefore, development has begun of a new type of bin, 8.5 meters in diameter, with an overall height of 26.6 meters and a capacity of 1,000 tons. The first silo of this type was built for the Agricultural Procurement and Supply Enterprise in Brno, Slavkov storage facility. The unloading of the flat bottom of the bin pneumatically by the Wentiflow system proved, however, that this process is very energy intensive. Mechanical unloading of grain with a screw conveyer was tried out.

The bins with flat bottoms appear to be simpler from the standpoint of construction work. The need for making a deep conveyer tunnel below the foundation slab complicates the construction part, however, especially the need for reliably sealing the conveyer passage from ground and surface waters. Therefore, in another alternative, it was decided to work out, even for an 8.5 meter bin, a cone hopper above ground. From an operational standpoint the cone hopper is the most advantageous solution for the reliable and dependable unloading of the entire silo without the consumption energy. At the producer plant the development of steel hoppers, including the support rings, the support systems, and the basic structural parts connected with this required a longer time period to master all design and production stages for this large single-design production.

For the accelerated testing of bins with cone hoppers 8.5 in diameter an alternative solution was offered, a combination of a series-produced hopper 6 m in daimeter with a concrete landing. The purpose was partially to test new steel bins 1,000 tons in capacity with cone bottoms, and partially to build a production unit that would adhere to the principles cited below and that would reflect the concepts of agricultural enterprises for the workup of a modern grain storage facility.

Requirements for Storage Technology

Tower silos for storing grain composed of 1,000-ton-capacity bins to provide a storage capacity of 2,000-8,000 tons for the long-term storage of all types of grain with up to 14 percent moisture content, with the possibility of temporary storage of grain with a higher moisture content. Allowing in the design for the possibility of connecting up the silo to threshing operation lines.

Limiting maintenance requirements of the silo by using enameled sheets.

Achieving the complete waterproofing of the interior of the silo by coating the wall plate seams on the other side.

By covering the conveyer on the silo roof, preventing rainwater from penetrating, and protecting operators and equipment from the effects of the weather.

Simplifying production control from a single control point, from which it would be possible to check the conveyer equipment visually.

Equipping the silo with signalling equipment that would indicate how full the bins and the dispatching bunkers are.

Equipping bins with suspension thermometers with remote indication.

Equipping the silo with forced-air ventilation for all bins.

The Requirements for Conveyer Technology

Installing conveyer equipment with a minimum capacity of 60 t/hr^{-1} for loading and unloading.

Allowing for the simultaneous loading and unloading of the silo, and when needed, passage between individual bins.

Constructing a large receiving bucket for filling the silo with high-capacity conveyance means.

Accelerating the unloading of a silo by using dispatching bunkers.

Compiling the conveyer technology from products currently available on the market that have low energy consumption and are reliable in operation.

Design Realization

The Agricultural Machinery Design Center, national enterprise, in Vitkovice, in cooperation with the Agricultural Construction Enterprise in Benesov, has designed a 4,000-ton-capacity tower silo for grain for the Vlasim State Farm, Pavlovice center, that takes into account aforenoted requirements, with the following conceptual plan:

The tower grain silo is composed of four circular steel bins 8.5 meters in diameter, 24 meters high, 1,250 cubic meters in volume, and with a permissible load of 1,000 tons of grain (Figure 1).

The bin base consists of a reinforced concrete slab (4) in the shape of a semicircle, in which is anchored a steel hopper 6 m in diameter (2) with a discharge plug. The prefabricated steel forms for repeat laying of concrete facilitates the construction of the landing.

At the level of the upper edge of the steel hopper, the bin wall (1) is also anchored to the landing with an angle mounting bracket and with stay bolts bolted tightly to the landing. In the direction of the longitudinal axis of the bins there are two passageways (16 in figures 3 and 4) in the landing wall for unloading the conveyers and for operational purposes. The bins are connected with each other by belt conveyers that connect with the bucket conveyers.

In loading the silo (figures 2 and 5), the grain is unloaded from the conveying equipment onto the intake grate of the receiving hopper (10). The grain passes by means of the receiving hopper outlets to the lower end of the bucket unloading conveyer (17), which is raised to the upper end (20), from which it falls through pipes (21) to the belt filler conveyer (6), which travels on rails. By setting the outward movement of the conveyer over the middle of the individual bins, and if needed, by reversing the [direction of] belt travel, it is possible to fill all bins with one conveyer.

In unloading the silo (figures 3 and 5), the grain falls through the regulating baffle plate (15) of the cone unloading hopper onto the belt unloading conveyer (8), from with it is directed via gravity piping (18) to the bucket conveyers (11 and 12). The unloading conveyer (12) fills the dispatching bunker (14) by means of gravity piping.

During grain treatment, the grain falls via the passageway from the bins onto the unloading belt conveyer (8) from which is goes via gravity piping (18) to any empty bin.

The bins are equipped with ventilation equipment for forced-air ventilation (figure 1), which consists of a fan, a pressure pipe (23), a circular channel (24) within the circumference of the bin wall, and radial chambers (25) covered with louvers.

The specifications of the technological equipment used are given in Table 1.

Table 1. Specifications of Technological Equipment

Equipment	Quantity needed
Towers for grain, Vitkovice type Z-9141	4
Steel structure of the conveyer bridge	4
Bucket Conveyer DoKV80-25:	
L = 18 m	1
L = 32 m	1
Filler belt conveyer, DoP 650-15	1
Belt lifting conveyer, DoP 650-16	2
Underpass bunker, ZS-P-34	2
Loading and unloading piping	
Additional structures and control mechanisms	
Forced-air ventilation fan, APM-500	4
Siloterm thermometers	4
Electrical installations--circuit breaker	1
Investment outlays for the major parts of the silo:	
Supply of technological equipment	1,979,311 Kcs
Installation of technological equipment	374,593 Kcs
Construction	829,860 Kcs
Total investment outlays	3,183,764 Kcs

Realization of Construction

After ratification proceedings were completed construction work was begun at the end of 1977, and was conducted by the investor at his own expense. After the completion of the foundation and the landing, the steel unloading hoppers were mounted. During the second quarter of 1978, installation of a tower supplied by the Vitkovice national enterprise began. Installation, including the production of a prototype structure of a conveyer bridge directly on the construction site, took place within the established time periods so that at the beginning of the fourth quarter of 1978 the construction of the tower was completed. During the second quarter of 1979 installation of the technological equipment began, and the electrical installations were prepared, with the expectation that the construction would be compleetd by the 1979 harvest.

Conclusion

The non-traditional concept of tower storage of grain in Pavlovice necessitated joint efforts during the course of construction, on the part of both the designers, the supplier organizations, the installation organization and the Vlasim State Farm, which carried out the steady process of construction in its operational aspects.

The experience with operation during the harvest shows the extent to which it has become possible to realize the objective of the construction. It is already evident today that the construction of similar projects is within the capabilities of the majority of large agricultural enterprises. Such investment outlays, established by the plan at 795.94 Kcs per ton of stored grain, are very favorable. From the supply standpoint, it would be necessary to have the necessary technological equipment produced in shorter time periods. It would be a pity, therefore, not to use the experience obtained for the construction of new grain storage facilities, which have been in chronically short supply at agricultural enterprises.

5808
CSO: 2402

HUNGARY

LABOR PSYCHOLOGY LABORATORY OF THE CSEPEL IRON AND STEEL WORKS

Budapest MAGYAR PSZIHOLOGIAI SZEMLE in Hungarian No 1, 80, pp 77-81

[Interview with Jeno Dulin, the director of the Labor Psychology Laboratory, by Zsuzsa Csaszar]

[Text] Csepel Works is one of the largest trusts in the country; it employs almost 30,000 people in its 11 factories. Today, the work of the psychologists in its Labor Psychology Laboratory is almost essential to its productivity. The material and personnel level of the Laboratory and several presidential directives indicate that the leaders of the enterprise regard this work as an important one. The laboratory occupies the fifth floor of the enterprise health center. Its examination, waiting, and evaluation rooms occupy 600 m^2.

[Question] What were the needs that led to the creation of the united health center?

[Answer] The management of the enterprise always watched over its workers but there had not been, within the enterprise, a united institution whose activity extended equally to the medical and psychological problems that are connected with work. This is why the health center was built. It was inaugurated on 20 Aug 78.

Its activity is directed by a board of directors whose members are the directors and the three deputy directors. The larger questions are decided by the board of directors; professional and narrower problems are always decided by the leader of the given area. For this reason, very good relations prevail between the physicians and the psychologists: they ask for and receive and respect each others' opinions. At the examination of newly hired personnel, we consider someone of a given profession only when the medical and psychological opinions agree.

[Question] How many people work in the laboratory?

[Answer] We have four psychologists and five assistants. They also carry out the research of the laboratory.

[Question] The rooms of the laboratory are well-lit and spacious. How good is your equipment? What instruments and tools do you have?

[Answer] Our equipment is worth 3 million Fts. We have 60 instruments, almost 100 written tests, and various model equipment as well. The great majority of our equipment and tools were made in the Csepel Works.

[Question] Where did you start and did you get thus far?

[Answer] The laboratory was founded in 1965, at a time when the psychological laboratories spread like mushrooms in the various factories. In the beginning we had 10 people; a sufficient number. Our problem was that the majority of our workers did not have a psychology degree. Also, we did not have rooms. The situation stabilized by 1966: we received laboratories, equipment, and tests. We received complete financial support from the management of the enterprise. In the beginning, our goal was to make standard values and we determined age- and profession-centered standards. Simultaneous to this, we started to work on job profiles. Since the laboratories belonged to the Accident Prevention Department at the time, we first examined the accident-prone jobs.

We also started on the technical psychological activity. We helped the enterprise's reconstruction in developing equipment that suits the man-machine system best. Job profile research is continuously expanded. In the past 12-13 years we have been able to carry out methodology-based suitability studies on 40 jobs.

[Question] Does this mean that one of the conditions to be hired for these jobs here is psychological suitability?

[Answer] Yes. The president's directive regulates that in chosen, appointed, or filled positions no person who is not psychologically suitable can be employed--even in the present, difficult labor supply situation. This order is unique in the country. I think this illustrates well the respect for psychology.

[Question] What happens to those who are found to be psychologically unsuitable to fill a position?

[Answer] There are two possibilities. If the person is newly hired, Personnel will look for another job for him; in general, a job that does not require a previous psychologic examination. But it often occurs that his habits and talents are unsuitable even in the second job. Let me illustrate this with numbers.

There are about 5600 job classifications in Hungary. It is known that a normal and healthy adult can carry out 10 percent of these. Here, at the Csepel Works, there are 1400 jobs--hence, the 10 percent amounts to 140 classified jobs and we need that many job descriptions. We are now looking at 40 jobs, hence we lack 100. To finish the survey, we need about 10 years.

In the second case, the examinee is already working here and is being transferred to a job that is covered by the president's directive. We have to carry out a suitability examination. If the workers is found unsuitable, he returns, in 99 percent of the cases, to his earlier job. About 1 percent of the workers are dissatisfied with the decision. They generally quit.

[Question] How many people do you examine in a year and what percentage is suitable?

[Answer] We examine about 1000-1500 people per year. The spread is so large because every year courses are started that have varying number of participants. A prerequisite of the course is psychological suitability.

Generally, 95 percent of the examinees are suitable for the job. Seventy percent of the ones who pass get at least an average score. Only 50 percent of the applicants fill the job requirements completely. There are very few people who work in a job after they had been found unsuitable by the psychologic examination.

[Question] Do the workers accept the opinion of the psychologist? How do they relate to the laboratory tests.

[Answer] We carried out an in-house experiment to determine, among others, how the examinees adapt to the psychological examination and the psychologist's decision. We found that they accept the examination if they are suitably prepared for it. In the experimental group, the workers were told of the psychologist's expectations before the examination. The control group was not told anything but was started on the examination immediately. This group had much worse results. The method used for the control group was used only in this experiment; the experimental method is now routinely used. We also have the habit of drawing everybody's attention to those good and bad points that can help or hinder their job performance.

The high-scorers are followed. We draw the appropriate company organs' attention to them and they see to their further education.

[Question] Does the psychologist's work extend to taking care of the employees' personal problems?

[Answer] There are times when the employees try to use us as a "psychological emergency." If we can, we help. If there is a serious problem, we refer the inquirers to the appropriate organ.

We also try to ease the adjustment of the new workers. By using sociometric tests, we try to set up optimum work groups. We also help in the rehabilitation of accident victims. I think we solve many personal problems with this.

The clinically-trained psychologist can have an important role in this job: by using the proper personality diagnostic methods, he makes it possible to arrive to a precise diagnosis.

Among other organs, the work of the factory rehabilitation committee would be more complete if there were a clinical psychologist on the committee. A clinical psychologist worked for 6 years in our laboratory, with great success: he defended his doctoral dissertation with work that was done here. We do not have one now although we would be very happy to have a professional with clinical training. Work psychology positions are not attracting applicants. I have often wondered what prompts 80 percent of the students to want to be clinicians though it is well known that yearly fewer jobs are advertized, while the number of positions for labor psychologist jobs keeps increasing. I think the university students do not know what is expected of them in a factory. They do not know the work here and have only distorted images of it. The situation may change with the start of specialty training.

[Question] How do the laboratory's other employees participate in the training of psychologists?

[Answer] We are giving laboratory training to fifth-year students, but, alas, only a few hours per student.

[Question] What kind of scientific research is carried out in the laboratory?

[Answer] Our primary work is applied research, aiming to solve practical problems. Our present research themes are the following:

--Research into some factors of the process of teaching a job. As a result, in some jobs we succeeded in halve the time needed to learn the tasks.

--We intensively research the multiple accident victims. We try to find the personality factors that influence accidents. We primarily examine those who have had more than two accidents within a year. The data is still being studied and promises good results. One of our colleagues has registered [to do] postgraduate work in the topic.

--We examine motivation, interest, and [social] adjustment of the workers who are making high-accuracy machine tools.

[Question] Our question is whether it can be determined how successful a person will be on the job?

[Answer] In this prediction we have to take into consideration not only what the job demands but also many other personality factors. As a result of our research we can say that to assure good work performance, we have to be concerned with our workers' educational, psychological, and personnel problems and their adjustment within a uniform framework. We have to assure a creative atmosphere and good collegial contacts. These cannot be left to chance. Helping to identify with the work increases successful performance. This was the defense of my candidate dissertation in 1978.

[Question] What are your plans for the laboratory's future work?

[Answer] Presently every psychologist in the laboratory is doing experimental and research work. In the future, we would like to separate this. We plan to have three groups: one just for doing job suitability testing, the second would prepare to do technical psychology research and also relate to the biotechnical research, and finally the third would do research in group adaptation.

[Question] What characteristics should the professional have who wants to solve labor psychology problems? What is the "ideal" labor psychologist?

[Answer] This will sound strange: First, he should not be a psychologist but an average person who can adapt well to his environment, who has no conflicts with his colleagues, can solve human problems well, is receptive to technical subjects (concerning organization, technological, and developmental questions) and can become a partner to technical leaders in these matters. This does not mean that the psychologist will always play a secondary role: there are tasks where they count on him first.

The psychologist should be interested, able to act, and have possibly the ability to cooperate. It would not hurt if he had a pedagogic bent because in Hungary the average person's awareness of psychology is very low.

The good labor psychologist has to keep his eyes open [be aware]. Since we do not have a great tradition in applied labor psychology, often the psychologist himself has to decide what he is going to concern himself with. It depends on his choice how the psychological activities are organized in a factory. Naturally, dedication is necessary for successful performance.

[Question] What problems does a beginning labor psychologist overcome?

[Answer] He has to expect two fundamental difficulties. The managers often expect the psychologist to solve a problem in a factory that which has bothered them for a long time--and could not solve. For a beginning professional--who has no factory experience yet--this will presage a failure.

The second great possibility for failure occurs when a psychologist has to solve problems for which he does not have the necessary experience and training--and do so alone. If he can avoid these obstacles and has the above qualifications then there is every hope that he will become a successful worker and good professional.

[Question] Thank you for the conversation.

10,101
CSO: 2502

COMPUTERIZED CHARACTER READERS DEVELOPED FOR PRINTING, INFORMATION

Warsaw TRYBUNA LUDU in Polish 22 Apr 80 p 8

[Article by K. P.: "In the Workshops of Polish Scientists: A Text-Reading Machine"]

[Text] The achievements of the Institite of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, relating to the development of a programmed text character reader were mentioned a year ago in the Polish press. This device could potentially revolutionize the nation's printing industry and markedly streamline information processing. The potential still exists, although a whole wasted year is not without significance.

Research into models of segments of the path of vision has resulted in the development of automatic readout devices. At first these devices could identify and code machine texts of high quality that were written in appropriate type-faces. These first machine-print readers, designed by the team under Engineer Mark Decowski, still operate at the printing shop of the House of the Polish Word in Warsaw.

Further research into the readers has resulted in the development of new improved so-called programmed text readers or PTR by the team directed by Engineer Slawomir Tyszko. The new devices are equipped with their own minicomputers and can read out at high speeds different text type-faces following a mere change in their software. The PTR can read from 160 to 320 text characters per second depending on the quality of the typescript: thus, it can replace 20-60 typists operating keyboard devices for manual coding of data.

Such readers misread at most one character per 100,000 or per 50 sheets of typescript. Intervention by the operator is needed only when the quality of a character is such as to hinder the machine from reading it. Such advantages of the PTR open broad vistas for their application not only in typography for coding textual information for automatic composiing systems but also in all data-processing computer-computation centers.

Major interest in these readers and even the readiness to finance further design and documentation work has been expressed by the Prasa-Ksiazka-Ruch Workers' Cooperative Publishing House. Further work to activate series production was to be carried out by the Mera-Elwro Research and Development Center. However, this work was abandoned owing to the reorganization and change in nature of research at that center. At present the Institute of Biocybernetics and Biomedical Engineering (IBIB) has decided to build the readers with the resources of its own Experimental Plant. It is unlikely that, despite the assistance of Elwro, that plant will be able to satisfy domestic demand for the readers.

IBIB designers continue their work to develop a program assuring the use of PTR to read hand-written text. The Central Research and Development Laboratory of the Postal Service is interested in that project, since then the readers could be used in mail sorting. The research plans include the development of a reader which, in tandem with a sound synthesizer, could act as a reading-device for the blind.

1386
CSO: 2602 END

SELECTIVE LIST OF JPRS SERIAL REPORTS

EASTERN EUROPE SERIAL REPORTS

EAST EUROPE REPORT: Economic and Industrial Affairs
EAST EUROPE REPORT: Political, Sociological and Military Affairs
EAST EUROPE REPORT: Scientific Affairs

WORLDWIDE SERIAL REPORTS

WORLDWIDE REPORT: Environmental Quality
WORLDWIDE REPORT: Epidemiology
WORLDWIDE REPORT: Law of the Sea
WORLDWIDE REPORT: Nuclear Development and Proliferation
WORLDWIDE REPORT: Telecommunications Policy, Research and Development

END OF FICHE

DATE FILMED

11 JUNE '80

MAK